

THE GOLDEN SNOW-FLEA, *APHORURA COCKLEI*, N. SP.

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(Plate 5.)

In British Columbia there is a minute yellow Collembolan that appears in crowds so dense as to cover the snow with a carpet of gold.

This species was discovered by Mr. J. W. Cockle, of Kaslo, B. C., whose specimens and data sent to Doctor Fletcher were by him referred to the writer.

The literature on Collembola contains many references to snow-fleas, and one author, Dr. R. Latzel, has made a convenient summary of all that has been written on the subject (Carinthia, II, Nos. 5 and 6, Mitt. Naturh. Landesm. Kärnten, 1907).

In the United States only "black" snow-fleas have figured in the literature, and the species that has done most to deserve the name of snow-flea is *Achorutes nivicola*, Fitch (see Psyche, Vol. 9, p. 315), a dark blue species that swarms on the snow every year, in Massachusetts and New York, and doubtless elsewhere. It is not often reported, however, since it becomes active at a season when most of the collectors are still dormant.

When most of the insects also are hibernating, Collembola are active—even before *Boreus* appears, and before the winter species of Perlidæ, Culicidæ, Chironomidæ, Bibionidæ and Muscidæ are on the wing. Collembola revive at a temperature that is too low to arouse other insects; in the Arctic region they flourish when other insects fail.

During his experience of many years in the mountains, Mr. Cockle saw this golden snow-flea for the first time in 1906, and again in 1908; and his inquiries among men who spend most of their time among the snows have not enlightened him as to the occurrence of the species in other localities. He has not found it on his summer trips among the glaciers; in fact, he has found it only at Kaslo, on a steep bank one hundred feet above the river, at an altitude of 2,250 feet, and surmises that it came from the river. None of the Collembola are known to be aquatic in their development, however, though some of them frequent the surface of water, and most of them require a moist atmosphere; and the snow-fleas develop in the soil or under loose bark or moss. This genus *Aphorura* is essentially, but not altogether, terrestrial; but the black snow-fleas of the genus *Achorutes* develop under bark, as a rule, where they can be found in the dead of winter, long before they appear on the snow.

Mr. Cockle is as yet alone in his enjoyment of the spectacle presented by the golden snow-flea. He writes enthusiastically about these lively creatures that illumine the snow over patches of several square yards. As the snow melts, the snow-fleas are carried off in the currents of water and deposited on the surfaces of the pools, where they accumulate in immense numbers. They cannot sink in water, on account of their clothing of bristles, and even in strong alcohol they are not easily immersed without being shaken in the fluid, unless the fluid is hot.

The golden snow-flea loses its colour when it dies out of doors in the pools, and becomes dirty white; but when the insect is preserved in alcohol or Canada balsam, the pigment is singularly permanent; the specimens that Cockle sent out two years ago are now as vividly yellow as ever.

Strictly speaking, the colour is not golden-yellow, but lemon-yellow—even though the former would be preferable on account of its associations.

Aphorura Cocklei, n. sp., is lemon-yellow and slender. Head with one pseudocellus behind the base of each antenna (Plate 5, Fig. 1). Postantennal organ of eight to ten papillæ, which vary in form within the limits of oval, ovate and elliptical (Figs. 2, 3). Antennæ three-fourths as long as the head. Antennal organs five-lobed (Fig. 4), the lobes being stout, rounded, and suboval, subovate or subconical. The number of dorsal pseudocelli to each body segment is successively (Fig. 5) 0, 2, 2, 2, 2, 2, 2, 4, 0. Anal spines two (Fig. 6), stout, curved, subequal in length to one of the unguis, and seated on separated, or nonconfluent, papillæ. There is no trace of a furcula. Claws similar throughout, the first pair being slightly larger than the rest; unguis (Fig. 7) stout, feebly curved, untoothed; unguiculus two-thirds as long as unguis, with semi-elliptical basal lamella and acuminate prolonged apex; tenent hair single, simple, and as long as the unguis. Clothing of minute curved setæ and fewer but longer stiff setæ. Maximum length, 1.8 mm.

Tullberg's description of *Aphorura sibirica* (Collembola borealia, 1876, p. 40) applies, so far as it goes, to this snow-flea, but applies equally well to a second species; for the description is broad enough to include at least two distinct species. The other of these is a form which Dr. Karl Absolon found in the caves of Moravia; and because it fell under Tullberg's description of *sibirica*, he retained that name for the cave form, and at the same time gave a good description of the species (Zool. Anz., Bd., 23, 1900, p. 408). This description of *Aphorura sibirica*, Tullberg-Absolon, fits our golden snow-flea, which has, however, certain characters that Absolon did not mention.

Upon finding that Cockle's species agreed in every respect with Absolon's description, I sent specimens and drawings to Absolon, in order to determine whether the two species were the same. He informed me that they were not; that his species was always white, and not so slender as the yellow one; and he sent me eight specimens of his cave species, from which to draw my own conclusions.

I agree with him that the two species are distinct. They are sharply separated by striking differences in colour and form, and by less striking but not less constant differences in the antennal organs and the clothing. In *sibirica*, Tullberg-Absolon, the lobes that constitute the antennal organ are slender and finger-like—quite unlike those of *Cocklei*. In *sibirica*, T.-A., the minute curved setæ of the body are few; in *Cocklei* they are numerous, and interspersed with longer and stiffer setæ; and the arrangement of the setæ is conspicuously different in the two species, as is indicated in Figures 8 and 9.

Since the golden snow-flea refuses to take the name of *sibirica*, we must give it a new name; and it is appropriate, as Dr. Fletcher suggests, to name this energetic entomological inhabitant of British Columbia after Mr. J. W. Cockle.

Four hundred and ninety-nine types, Kaslo, B. C., Jan. 31 and March, 1906; Feb. 23, 1908; J. W. Cockle. Many of the types have been sent to the U. S. National Museum, Washington, D. C., and to the Museum of Comparative Zoölogy, Cambridge, Mass. Others will be sent to specialists in this order of insects.

PLATE 5.

Fig. 1. *A. Cocklei*.—Base of left antenna, $\times 200$.

" 2. " " Postantennal organ of right side, $\times 1234$.

" 3. " " " " " " " "

" 4. " " Right antennal organ, $\times 823$.

" 5. " " Dorsal pseudocelli, $\times 43$.

" 6. " " Right anal spine, $\times 400$.

" 7. " " Left foot of first pair, $\times 400$.

Fig. 8. *A. Cocklei*.—Setæ near median dorsal line of metathorax,
 $\times 300$.

Fig. 9. *A. sibirica*.—Setæ near median dorsal line of metathorax,
 $\times 300$.